4b Analysis for Dogfish Creek

The Washington Department of Ecology (Ecology) Integrated Report (IR), which was submitted to EPA in May 2008, has excluded eight listings (7633, 7636, 7637, 7639, 7640, 23695, 38544, and 53092) for fecal coliform in Dogfish Creek and the East and West Forks of Dogfish Creek, from the 303(d) list and placed these waterbodies in category 4b of the IR. 53092 is a new listing, all other water bodies were listed in Category 4b of the 2004 IR. In addition to these eight water bodies, one other, listing number 38540 was also listed in Category 4b on the 2004 list. This listing has been included as part of water body 7633 on the 2008 list. This is a result of mapping differences between the GIS layers used for the map tool. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

The Washington State Department of Health has classified the head and eastern shoreline of Liberty Bay as *Prohibited* for shellfish harvesting due to marine fecal coliform levels in excess of the water quality criteria since 1967. At that time, Liberty Bay was managed as Conditionally Approved based on the operating status of three sewage treatment plants that discharged into the bay. It was also recognized that nonpoint pollution entering the bay by way of Dogfish Creek, municipal stormwater runoff, and waterfront marinas were significant sources of bacterial contamination. As a result, a sanitary line was established which prohibited the commercial harvest of shellfish from the eastern half of Liberty Bay and the northern end where Dogfish Creek enters the bay.

Between 1978 and 1979 the treatment plants were eliminated and sewage was redirected to a plant outside Liberty Bay for treatment and discharge. By 1989 the separation of stormwater and sewage distribution systems around Liberty Bay was complete. The elimination of these point sources made it necessary to reevaluate conditions in Liberty Bay and determine how the shellfish growing areas should be managed.

In 1991, the Washington State Department of Health reevaluated the status of shellfish growing areas in Liberty Bay. It was determined that the primary source of fecal coliform contamination entering Liberty Bay was Dogfish Creek. The Department of Health's evaluation resulted in reclassifying the western shoreline and northern end of the bay as Restricted and maintaining the Prohibited status for the head and eastern shoreline. In 1996, the classification for the western shoreline and northern end of Liberty Bay was changed from Restricted to Inactive status due to the suspension of shellfish relay operations in the area. Consequently, this growing area is no longer monitored by the Washington Department of Health for the purpose of shellfish classification.

Currently the only growing area in Liberty Bay open to commercial shellfish harvest is Lemolo Bay. Lemolo Bay is located in the southern portion Liberty Bay and has been classified as Approved since 1994.

Partly because of persistent shellfish bed closures in Liberty Bay, and because of ongoing exceedances of state water quality standards in Dogfish Creek, Kitsap County Health District, with assistance from an Ecology Centennial Clean Water Grant, began a Pollution Identification and Correction project in the Dogfish Creek watershed in 2000. The county believed that the primary sources of fecal coliform were failing septic systems and poor animal-keeping practices, and this has indeed proven to be the case.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

In 1993, the Kitsap County Board of Commissioners adopted Ordinance 156-1993, establishing the Kitsap County Surface and Stormwater Management Program (KCSSWM). The goals of the program are to:

- Protect public health and natural resources.
- Minimize institutional costs.
- Obtain support for the program from other municipalities, tribal governments, and county residents.
- Meet state and federal regulatory requirements.
- Provide a permanent funding source to address nonpoint source pollution.

The county's intent is to meet Washington's numeric criteria for fecal coliform by eliminating anthropogenic sources and to stay in compliance in the future through an on-going monitoring and correction program.

Surface and Stormwater Management Program (SSWM) fees are assessed on properties in the unincorporated area of Kitsap County. Fees appear on annual property tax billings. The 2008 budget for the SSWM is $5.6 million.

Funds are shared by the Kitsap County Public Works Department, which oversees the entire program; the Kitsap County Health District, which performs water quality monitoring, pollution identification and control, and wellhead protection programs; the Kitsap County Department of Community Development, which uses the funds for watershed planning; and the Kitsap Conservation District, which helps with agricultural landowner technical assistance, education, and source control.

The PIC Program uses water quality monitoring data to identify priority water bodies for clean up. The primary focus of the monitoring program is to assess long-term pollution trends associated with human sewage and animal waste from nonpoint sources. Health district staff sample water quality monthly at approximately 95 stations on 54 streams and bimonthly at 67 marine stations. Field equipment measures turbidity, dissolved oxygen, pH, and temperature. FC samples are analyzed by an Ecology accredited laboratory. Data are used to identify areas in need of pollution control and to evaluate the effectiveness of the correction program.

Clean up projects are designed to address the causes and sources of bacterial water pollution in specific geographic areas that the trend monitoring program has identified. SSWM provides funding for PIC projects. The goal of each PIC project is to:

- Protect public health.
- Protect shellfish resources.
- Preserve, protect, and restore surface water quality.

Through its monitoring program, the health district identified the sources of bacteria impairment in Dogfish Creek as:

- Failing on-site septic systems,
- Livestock management problems, and
- Manure runoff problems.

The best management practices (BMPs) being used to improve water quality include a requirement to properly operate and maintain on-site systems in the watershed. Kitsap County Health District (KCHD) is actively engaged in on-site system education, dye testing of suspect systems, and enforcement of Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems. In addition, the Kitsap Conservation District assists small farm owners and owners of livestock to implement BMPs for animal waste management and farm pollution control. The conservation district's role is as a non-regulatory agency. When a regulatory approach is needed, the Health District enforces the *Solid Waste Regulations* (KCBOH 2004-2).

Several enforceable pollution controls will assure that compliance with water quality standards is achieved.

- Kitsap County Ordinance 156-1993, establishing the Surface and Stormwater Management Program, which created an on-going, stable source of funding.
- Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.
- Kitsap County Board of Health Ordinance 2004-2, *Solid Waste Regulations*, which regulate handling and disposal of animal manure and pet waste; animal waste violations are enforced by the Health District under this ordinance.

Kitsap County Health District completed the Dogfish Creek Pollution Identification and Correction (PIC) project in 2004 during which a total of 145 properties were identified and inventoried in the watershed. The PIC Program focused on properties that are most proximate to streams and have the highest potential impact (47 properties adjacent to fresh water shoreline), but because drainage systems can deliver stream pollutants from remote places in the watershed, the PIC Program elements were applied watershed–wide.

During the Dogfish Creek PIC Project, eight on-site system failures and two animal waste management violations were identified. All eight on-site system failures were corrected by Kitsap County Health District. Kitsap Conservation District conducted an agricultural

inventory, planning, and implementation of BMPs to reduce agricultural bacteria and turbidity impacts to the stream. Two farms with animal waste management violations were identified. Both farms implemented corrective actions. Remaining and new sources continue to be identified and corrected as post corrective monitoring continues in Dogfish Creek.

Kitsap County Health District continues to have regulatory presence in the Dogfish Creek watershed to:

- Track water quality trends in fecal coliform concentrations through the Health District's on-going, countywide monitoring program;
- Respond to sewage and water quality complaints and repair FC sources including failing on-site sewage systems and animal waste;
- Work with Kitsap CD to address additional farms found to be violating state water quality standards for fecal coliform.

Since 2005, one failing on-site sewage system has been repaired in the watershed, and the Kitsap Conservation District worked with one property owner along the South Fork and one property owner along the West fork to protect water quality. Along the South Fork, a pasture drainage problem was improved, which should reduce fecal coliform contamination of a small seasonal tributary. In addition, a large project was completed on the West Fork, including 100 feet of animal trails and walkways, 5.8 acres of fish stream habitat improvement, culvert replacement, 3044 feet of livestock exclusion fencing, 517 feet of diversion, 5.8 acres of tree and shrub establishment, roof runoff system, and 30 feet of bank erosion protection. In addition, the City of Poulsbo and the Washington State Department of Transportation completed a culvert replacement and improved stormwater infrastructure, including bioswales on the South Fork. This work should reduce turbidity contamination and associated fecal coliform pollution in Dogfish Creek.

Estimate or Projection of Time When Water Quality Standards Will be Met

The designated uses for Dogfish Creek are Core Summer Salmonid Habitat and Extraordinary Primary Contact Recreation. Washington's fecal coliform bacteria standard for these waters has two parts. Fecal coliform organism levels shall not exceed a geometric mean value of 50 colonies/100mL, with not more than 10% of all samples (or any single sample when less than 10 sample points exist) exceeding 100 colonies/100 mL.

Kitsap Health District has continued monitoring Dogfish Creek and its tributaries at four monitoring stations. DF01 is a "mouth" station that includes flows from the east fork (ED01), the west fork (WD01) and the main stem. Flows from the south fork (SF01) enter the main stem below station DF01. Water quality at station DF01 improved from a geometric mean fecal coliform count of 322 in 1998 to a geometric mean of 62 in 2003. In the 2004 IR, based on an estimated incremental decrease in the fecal coliform geometric mean of 5 cfu per year, Dogfish Creek was expected to attain the water quality standard geometric mean of 50 cfu/100 ml by 2006, and to meet Part II of the bacteria

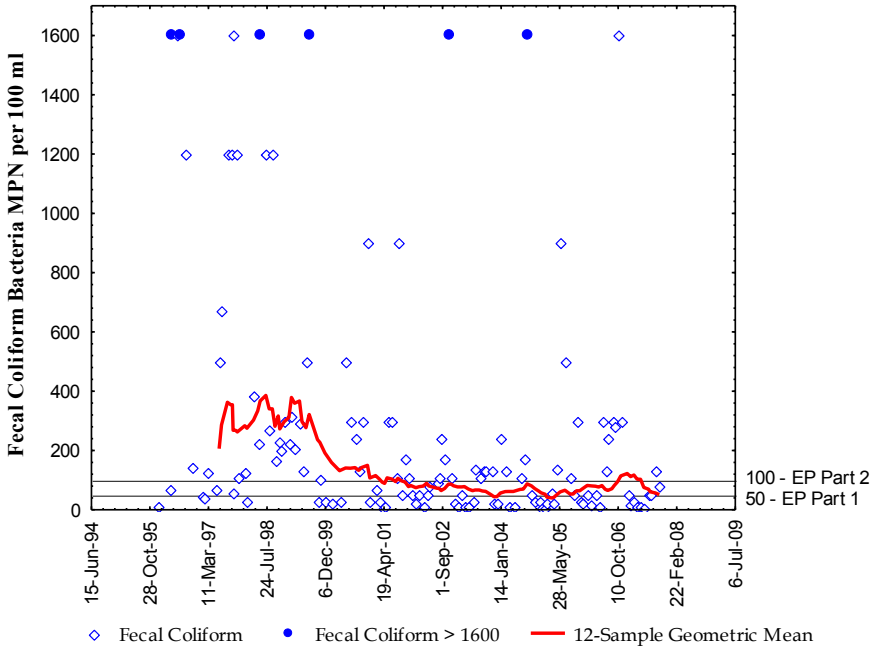
standard by 2008. . The most recent results are shown below. Based on the monitoring data, it may require two additional years for Dogfish Creek to meet the state's Part II Water Quality Standard for bacteria.

Dogfish Creek (DF01)
1998 – 2007 Fecal Coliform Results

Water year	Number of Samples	Range (FC/100ml)	GMV[1] (FC/100ml)	# Samples > 100 FC/100ml	% Samples > 100 FC/100ml	Meets WQ Standard[2]
98	13	30 – ≥1600	322	11	85%	No
99	12	30 – ≥1600	243	11	92%	No
00	8	23 – 500	100	5	63%	No
01	13	8 – 900	107	7	54%	No
02	12	11 – 240	72	5	42%	No
03	12	13 – ≥1600	62	6	50%	No
04	11	13 - ≥1600	77	6	55%	No
05	12	7 - 900	53	4	33%	No
06	12	14 - 300	82	6	50%	No
07	12	7 - 1600	51	3	25%	No

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 – 201A WAC).
[1] Geometric mean value
[2] Class AA - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis
Dogfish Creek (Station DF01), 1996 – 2007
Improving Trend



Dogfish Creek (SF01)
1998 – 2007 Fecal Coliform Results

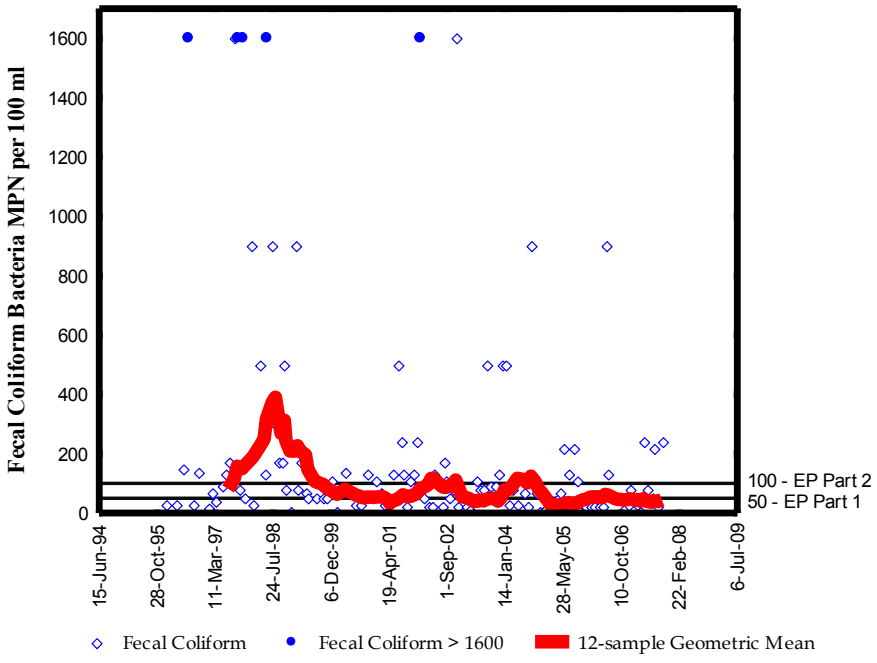
Water year	Number of Samples	Range (FC/100ml)	GMV[1] (FC/100ml)	# Samples > 100 FC/100ml	% Samples > 100 FC/100ml	Meets WQ Standard[2]
98	12	30 - >1600	269	9	75%	NO
99	11	8 – 900	92	4	36%	NO
00	7	8 – 140	44	2	29%	NO
01	12	2 – 500	56	6	50%	NO
02	12	23 - >1600	93	7	58%	NO
03	12	2 - 1600	43	3	25%	NO
04	11	23 - 900	107	4	36%	NO
05	12	4 - 220	33	4	33%	NO
06	12	21 - 900	46	2	17%	NO
07	12	4 – 240	44	3	25%	NO

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 – 201A-030 WAC)

[1] Geometric mean value

[2]State FC Standard- FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceeded 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis
South Fork Dogfish Creek (Station SF01), 1996 – 2007
Improving Trend



Dogfish Creek
Station ED01

Water Year	Number of Samples	Range (FC/100ml)	GMV (FC/100ml)	# Samples > 100FC/100ml	% Samples > 100FC/100 ml	Meets WQ Standard?
2003	12	<2 - 900	44	5	42%	No
2004	11	7 - 900	58	4	36%	No
2005	12	8 - 1600	49	3	25%	No
2006	12	13 - 900	72	4	33%	No
2007	12	2 - >1600	58	4	33%	No

Dogfish Creek
Station WD01

Water Year	Number of Samples	Range (FC/100ml)	GMV (FC/100ml)	# Samples > 100FC/100ml	% Samples > 100FC/100 ml	Meets WQ Standard?
2003	12	8 - >1600	82	4	33%	No
2004	11	11 - 900	52	3	27%	No
2005	12	<2 - 110	25	2	17%	No
2006	12	2 - 300	35	3	25%	No
2007	11	<2 1600	40	2	18%	No

As the most recent data show, water quality has been on a generally improving trend in Dogfish Creek. At stations SF01 and WD01, the standard for the geometric mean value has been met for the past three years. At stations DF01 and ED01 fecal coliform concentrations rose in 2006, but dropped significantly in 2007. This kind of variability, which in a watershed of this size, could be caused by a single failing septic system or a single poor manure handling incident, is a continual challenge in dealing with nonpoint sources of bacteria.

There has also been a generally good trend at all four stations toward meeting the second part of the standard in the years since the 2004 IR. Because of the size of the watershed and the nature of nonpoint pollution, we expect there will continue to be ups and downs in the fecal coliform concentrations. However, the trend is toward meeting standards, and we estimate that both parts of the standard will be met before Washington issues the next IR.

Schedule for Implementing Pollution Controls

As described earlier in this report, Kitsap County has already implemented the PIC program and is continuing periodic monitoring, identifying problems, and fixing them. This is an on-going program, exactly what's needed to solve nonpoint pollution problems and to keep them from happening again.

Monitoring Plan to Track Effectiveness of Pollution Controls

Kitsap County has a countywide monitoring program, and monitors Dogfish Creek as part of that on-going program. Samples are taken monthly and compared to the two parts of the fecal coliform standard. Assessment results are reported to the public and EPA through Ecology's IR report development process.

Commitment to Revise Pollution Controls as Necessary

Ecology will continue to work with Kitsap County to ensure that the PIC program continues and that water quality in Dogfish Creek continues to improve. We fully expect the program to achieve compliance with water quality standards. However, if it does not, Ecology will work with Kitsap County to determine other controls that could be used to achieve compliance.